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(54) Mounting for a Conveyor Belt Scraper

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ABSTRACT

The invention provides for a mounting for a belt scraper of composite construction. The mounting includes elastic biasing means which biases the scraper towards the belt and further includes a pivotally mounted lever arm by means of which the scraper can be displaced against the bias of the biasing means away from the belt when an obstruction projecting from the belt strikes against the scraper.

TITLE

"MOUNTING FOR A CONVEYOR BELT SCRAPER"

FIELD OF THE INVENTION

This invention relates to a mounting for a conveyor belt scraper.

SUMMARY OF THE INVENTION

According to the invention, there is provided a mounting for a belt scraper of composite construction comprising an assembly of components to permit displacement of the scraper during normal running movement of the belt in one direction when an obstruction projecting from the belt strikes against the scraper, the mounting including biasing means adapted to bias the scraper towards the belt, and further including displacement means adapted to pivotally displace the scraper against the bias of the biasing means away from the belt when an obstruction projecting from the running belt strikes against the scraper, the biasing means being provided at the pivot axis of the displacement means.

The obstruction may be an object held fast with the belt and protruding therefrom, e.g., a piece of rock, or a belt joint, or a bolt or screw, etc.

The displacement means may include a lever arm having at its one end, a formation in which a shaft supporting the scraper may be secured, and being pivotally mounted, at its other end, so that the lever arm can execute an arcuate movement about its pivotal mounting.

The member for securing the shaft of the scraper may be of annular configuration so as to receive the shaft therein. Screw-threaded bolts may be provided to be screwed

through the annular formation onto the shaft to secure the shaft therein.

The biasing means may be an assembly including a shaft of angular cross-section mounted within an angular sleeve with pads of elastic material, such as natural or synthetic rubber, interposed between the shaft and the sleeve. Thus, when the shaft is turned inside the sleeve, the elastic pads are compressed, thereby generating bias in the form of torque tending to return the shaft to a neutral position.

Alternatively, the biasing means may comprise a spring, e.g., a lever spring or a torque spring.

The biasing means is provided at the pivot axis at the pivotally mounted end of the lever arm. Thereby the bias stored in the biasing means is transmitted through the lever arm to the scraper by applying torque to the lever arm at its pivot axis.

The bias generated in the biasing means may have a predetermined value of a sufficient magnitude to ensure that the scraper is only displaced when an obstruction of a predetermined size or rigidity on the running belt strikes against the scraper.

A removable and adjustable stop may be provided for adjusting and limiting the arcuate travel of the lever arm, when predetermined blade wear has taken place.

The mounting may further include a sleeve to which the biasing means may be secured. By means of the sleeve, the mounting may be fitted in an operating position. It may for example be fitted by sliding the sleeve over a shaft and

screwing nuts onto the shaft against each axial end of the sleeve.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is now described with reference to the accompanying drawings in which:-

Figure 1 shows an elevational front side view of a mounting device for a belt scraper (also in partial phantom) in accordance with the invention;

Figure 2 shows a top plan view of the scraper mounting (also in partial phantom) shown in Figure 1;

Figure 3 shows an elevational rear side view of the mounting shown in Figure 1;

Figure 4 shows a perspective view of the mounting device shown in Figure 1 fitted in an operating position below a belt scraper;

Figure 5 shows an elevational side view of the mounting device and cooperating scrapers of Figure 4;

Figure 6 shows on an enlarged scale the scraper of Figures 4 and 5 during striking of an obstruction on the running belt against the scraper blade; and

Figure 7 shows an alternative belt scraper configuration in which the scraper blade trails the scraper mounting.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Figures 1, 2 and 3 of the drawings, numeral 10 generally indicates the blade mounting device. It is of a composite construction oomprising a lever arm 12, which has at its one free end an annular ring-like formation 14 defining an aperture 16. At its other end, the lever arm 12 is mounted to pivot about a pivot axis 18.

The mounting 10 further includes a biasing means in the form of a torque - generating means 20 located at the pivot axis 18 and which comprises a tubular sleeve 22 conveniently of square cross-section. It further includes a solid shaft 24 preferably of square cross section (Fig. 3) mounted inside the sleeve 22 by means of four pads 26, chosen of an elastic material, such as natural or synthetic rubber, which are interposed between the sleeve 22 and the shaft 24. When the shaft 24 is turned, the pads 26 are compressed, and thereby torque is generated which resists the rotation of the shaft 24 and tends to return it to a neutral position.

The mounting 10 further includes a vertical sleeve 28 having a substantial axial bore 30 The sleeve 22 of the torque generating means 20 is secured abutting to the sleeve 28 by means of an attachment 32, for example, in the form of welding, with or without a gusset. The angular disposition of the lever arm 12 is adjustable by means of a basing screw 34 which can be screwed into or out of a fixed position nut 36 held fast with the sleeve 28. A lock nut 37 secures the screw 34 once placed in a desired position.

Referring further to Figure 1, the arm 12 is shown in dotted lines in its neutral position. It can be displaced through an angle 38 from its neutral position, and this angle is about 55°. In order to pre-stress the torque,

generating means 20, the lever arm 12 is displaced from its neutral position through an angle 40 which may be about 25°, and the screw 34 is screwed to the desired position and locked by the lock nut 37. This serves to retain the lever arm in this position to ensure that the belt scraper assembly tracks the belt. It also permits the scraper assembly to be arcuately displaced via the lever arm 12 when an obstruction projecting from the belt strikes against the scraper assembly. When the mounting 10 is thusly pre-stressed, it is ready for installation in its operating position as is shown in Figures 4 and 5.

Referring now to Figures 4 and 5, the mounting device 10 is shown installed in its operating position on a belt scraper assembly generally 42, so that the assembly is biased to track and scrape a belt 44. The assembly 42 includes a carrier in the form of a scraper mounting shaft 46, and a plurality of scraping blades 48 mounted via a pivotal link 50 and a line 51 on the shaft 46. The shaft 46 extends through the annular formation 14 (Fig. 1) of the lever arm 12 of the mounting device 10. The annular formation 14 is clamped to the shaft 46 by means of clamping screws 52. The mounting 10 is fitted in its operating position by means of a screw-threaded, vertical shaft 54 (fig. 4) which extends through the bore 30 of the sleeve 28. The sleeve 28 is secured in an axial position on the shaft 54 by means of upper and lower locknuts 56 and 58. The shaft 54 is secured at its topmost end to a frame assembly 60 which is parallel to the upper run of the conveyor belt.

During normal operation, the belt drum 62 rotates in the direction of arrow 64 and the belt 44 is driven in the direction of arrow 66. The scraper assembly 42 is biased against the lower belt 44 by means of the pre-set torque provided in the torque generating means 20 of the mounting 10, and also by means of torque generated in

elastic pads 45 provided around a scraper unit pivotal solid shaft 43, which functions similar to the torque generating means 20 on device 10. By referring to Figure 5, it will be seen that the scraper assembly 42 can thus be arcuately displaced along an arcuate path 68 about the pivotal axis 18 of the lever arm 12, the radius of the arcuate path 68 being indicated by reference numeral 70.

Referring further to Figure 5 (and also to Figure 6,) when an obstruction 72 projecting from the under running belt 44 strikes against the scraper blade 48, the blade is forced away from the belt to the position 48.1 shown in phantom view. It does so by displacing the bar link 51 to the position 51.1 shown in phantom, and the lever arm 12 to the position 12.1 shown in phantom, around the pivot axis 18, against the preset torque - generated in the torque generating means 20. Thereby, the scraper blade 48 can clear the moving obstruction 72 without any damage to the blade, whereafter the blade is forced back against the running belt 44, because of means 20.

Referring to Figure 7, there is shown an alternative embodiment. A belt scraper 74 in which the scraper blade 48 trails the pivot axis 18 device 10, instead of leading it, as is shown in Figure 5. In this embodiment, a vertical line 76 passes through the extreme face 78 of the scraper blade 48, closest to or in contact with the belt 44, and also through the carrier shaft 46. It is at an angle 80 to the surface of the belt 44, the angle 80 being from 85° to 95°, and preferably at 90°.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. In a mounting device for a conveyor belt scraper assembly comprising an assembly of components acting to permit restorable displacement of the scraper blade during the normal running movement of the conveyor belt in one direction, when an obstruction projecting from the belt strikes against the scraper blade, the improvement comprising:

   (a) means biasing the blade portion of the scraper assembly into continuous contact with the running belt, said means consisting essentially of a shaft of generally rectangular cross-section disposed axially within a generally rectangular stationary tubular sleeve and spaced apart therefrom by a plurality of deformable but resilient supporting pads, which pads upon compression by the rotation of the shaft within said sleeve generate a torsional bias tending to return the shaft to a neutral position upon release of the rotational force thereon; and

   (b) means for displacement of the scraper assembly consisting essentially of a lever arm having at its one extremity a closure member in which another member supporting the scraper assembly may be positioned and secured, and having at its other extremity, a pivotal mounting so that said lever arm can effect a reversible arcuate movement about its pivotal mounting in response to the temporary displacement of the blade from the conveyor belt by any obstruction encountered thereon.

2. The mounting device as claimed in Claim 1, in which the biasing means is provided at the pivot axis at the pivotally mounted end of the lever arm.

3. The mounting device as claimed in Claim 1, in which the bias generated in the biasing means has a predetermined value of a sufficient magnitude to ensure that the scraper is displaced only when an obstruction of a predetermined size or rigidity disposed on the running belt strikes against the scraper blade.

4. The mounting device as claimed in Claim 1, in which the scraper includes a support shaft disposed on the displacement means, and in which a line defined by passing through the edge of the scraper closest to contact with the belt surface and also through the scraper assembly support is at an angle to the belt which ranges from 85° to 95°.

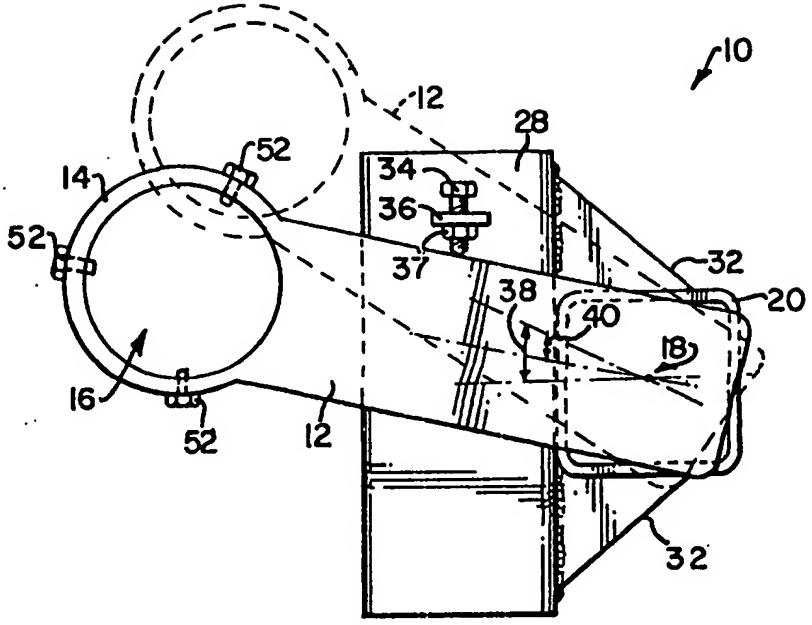

FIG 1

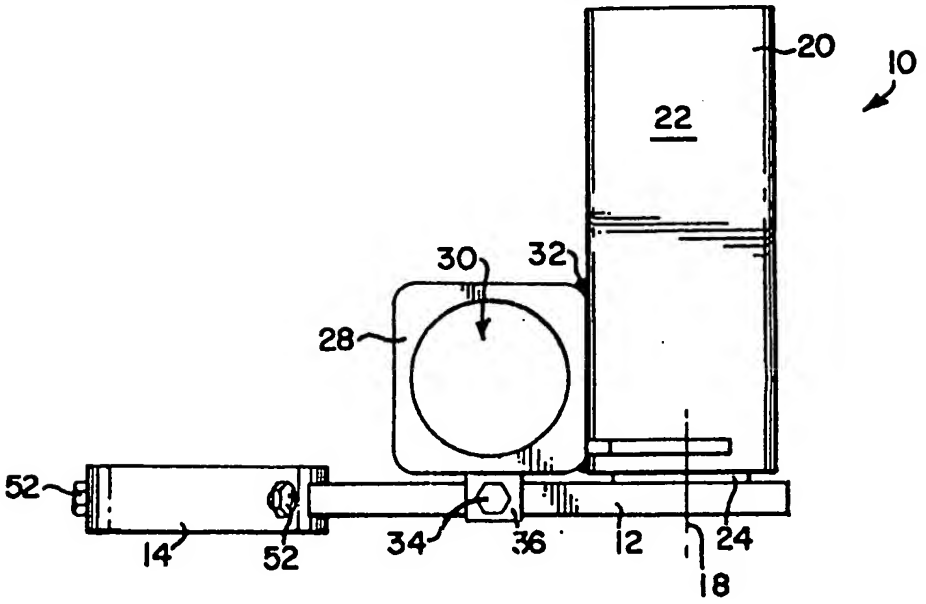

FIG 2

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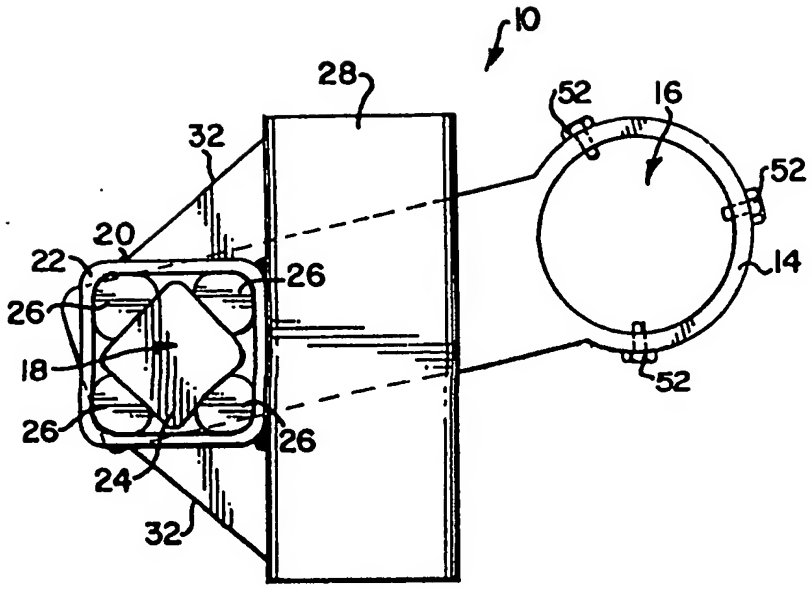

FIG 3

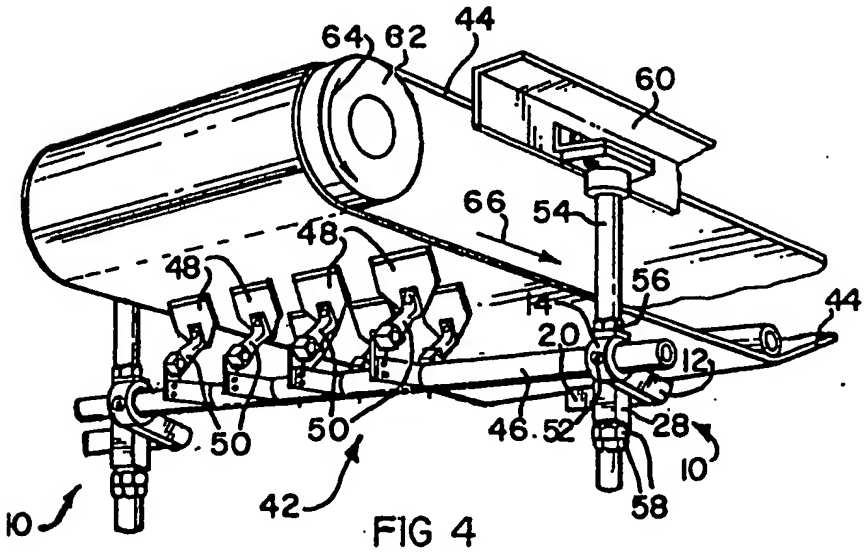

FIG 4

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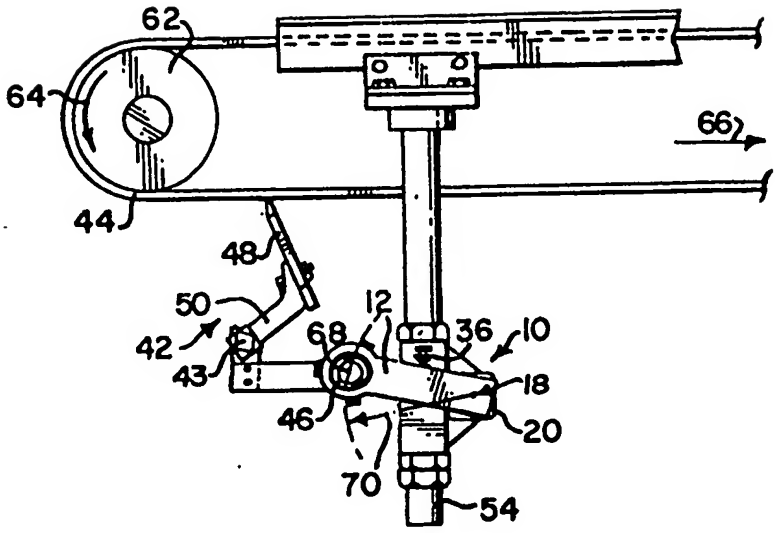

FIG 5

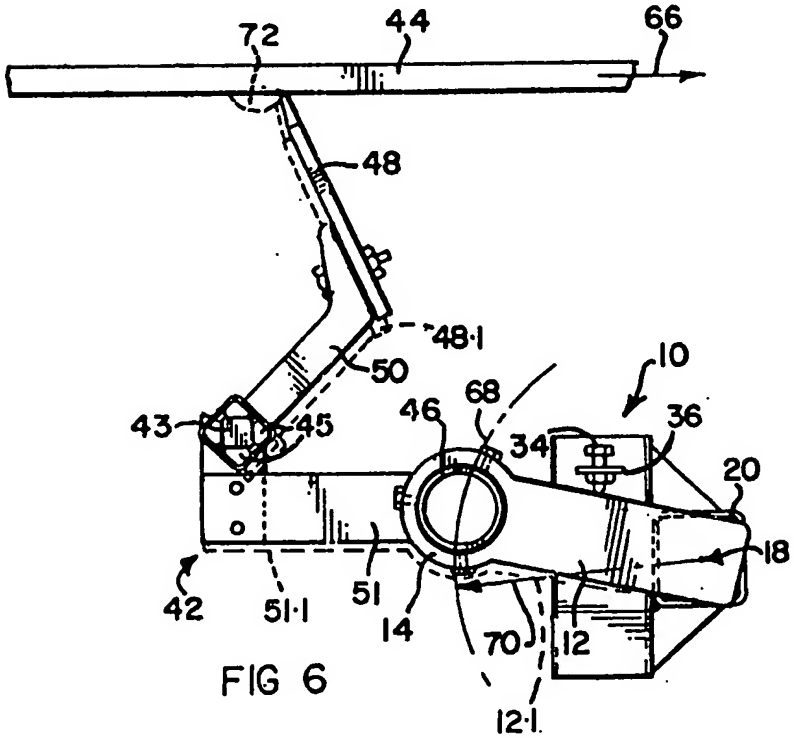

FIG 6

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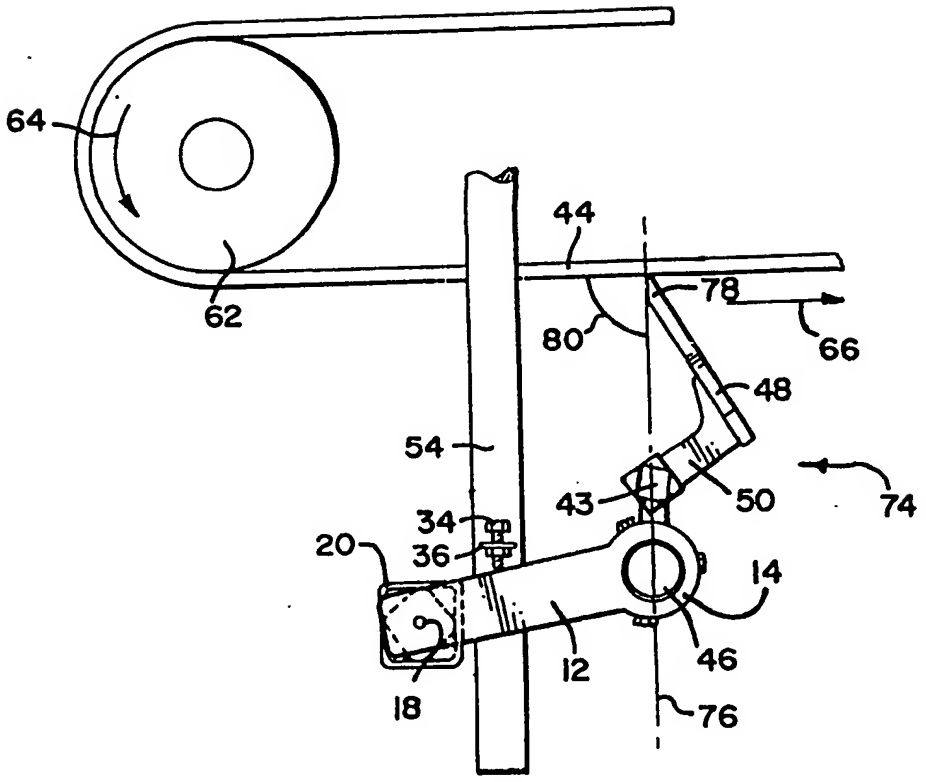

FIG 7

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